CLAIMS:

1. A micro-analytical apparatus for manipulating fluid samples, comprising a substrate having at least a first and second covered channel with openings at either end of said first and second covered channel, said first and second covered channels intersecting to form a common intersection, characterized in that at least three of the openings to said first and second covered channels are connected to a multi-port valve to control the pressure in the channels.

2. The apparatus of claim 1, wherein the substrate is made of a substance selected from the following materials glass, silicon, ceramics, organic polymers, metallic materials and mixtures thereof.

3. The apparatus of claim 1, wherein the channels in the substrate are covered by lamination, thermal bonding, anodic bonding, electrostatic interaction, pressure or a combination thereof.

4. The apparatus according to claim 1, wherein all of the openings at either end of the first and second covered channels are connected to the multi-port valve.

5. The apparatus according to claim 1, wherein the first or second covered channel contains a detection region.

6. The apparatus according to claim 5, wherein the detection region consists of electrodes, or a window for spectroscopic detection.

7. The apparatus according to claim 1, wherein the first or second covered channel is connected to a detection device.

8. A method of manipulating fluid samples using the apparatus of Claim 1 comprising the steps of:

a. mechanically pumping an eluent solution into one end of the first covered channel and through the intersection whilst applying pressure to either end of the second covered channel when the multi-port valve is in a first position;

b. then switching the multi-port valve to a second position so that a sample solution is pumped into one end of the second covered channel whilst pressure is applied at the other three openings; and

c. switching the multi-port valve back to the first position so that the sample is pushed from one arm of the second channel of the device into the intersection and along the first covered channel.

9. The method according to claim 8, wherein an electrical field is applied in a portion of said first or second covered channel in order to sustain or stop the flow of liquid during the injection step.

10. The method of claim 8, wherein pressure is applied only during the injection step.

11. The method according to claim 8, wherein in step 2(c) the sample is pushed from one arm of the second covered channel of the device into the intersection and along the first covered channel by means of electrophoresis, electro-osmosis or the like.

12. The method of claim 8, wherein at least part of the first or second covered channel contains a stationary phase in order to perform chromatography, electrochemistry, electrophoresis, immunological or enzymatic analysis or any combination thereof.